PowerHub® 7000/8000
Release Notes

Software Versions
PH_7PE_FT_5.0.1
PH_8PE_FT_5.0.1

MANU0254-06
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1.0 General Description of Software Release

This document outlines the features and enhancements in the *PowerHub®7000/8000® ForeThought®* 5.0.1 (PH_FT_5.0.1) software release. Refer to the *PowerHub 7000/8000 Installation and Maintenance Manual, MANU0166-02, PowerHub 7000/8000 Software Reference Manual, MANU0167-02 PowerHub 7000/8000, Filters Reference Manual, MANU0168-02 and PowerHub 7000/8000 Protocols Reference Manual, MANU0271-02*.

2.0 Software Enhancements

2.1 Local Area Network Emulation (LANE) Enhancements

2.1.1 Distributed LAN Emulation (DLE)

Distributed LAN Emulation (DLE) provides a way to add LAN Emulation (LANE) services and Emulated Local Area Network (ELAN) redundancy into an ATM network. Prior to PH_FT_5.0.1, the *PowerHub* used LAN Emulation Client (LEC) failover for redundancy.

With DLE, the LEC is no longer the redundancy point. Each ELAN can have many peers. Each LEC connects to the closest peer, and if that service location were to fail, the LEC simply re-registers with the next nearest peer of the ELAN's services. This removes the need for the LEC failover mechanism and provides for a more robust failover time.

2.1.2 LANE Plug-n-Play

In *ForeThought* 5.0.1, the *PowerHub* LEC includes a "hostname" string when talking to the LAN Emulation Client Server (LECS) and registers with the LAN Emulation Server (LES). The "hostname" string is the SYSTEM NAME.

2.1.3 Per-ELAN LECS Address Configuration

This feature allows the *PowerHub* to be configured in a way that allows each individual LEC instance serving a specific ELAN to contact the LECS in a unique fashion for cases where the users may want to force the *PowerHub* to a different LECS or simply reach a common LECS by a different means.

2.1.4 LANE Security/LES Connection Validation

When security is enabled and a LES receives a join request from a LEC, the LES checks with the LECS to verify this is a valid client for the ELAN.

2.1.5 ILMI LECS Discovery

The LANE 1.0 specification defines several ways a LEC is able to contact the LECS to get the LANE service information it needs. One way is via the use of ILMI.

2.2 Scalable Routing Enhancements

2.2.1 Internet Protocol (IP) Virtual LAN (VLAN) Enhancements

As of *ForeThought* 4.0.x, IP VLANs were first created, then segments assigned to those VLANs. All IP interface assignment and configuration then referenced the VLAN rather than the individual segment.

In *ForeThought* 5.0.1, the ability to add and remove individual segments to the VLANs without having to delete the VLAN and fully recreate it has been added.

2.2.2 IP Routing Table Size Management

In *ForeThought* 5.0.1, the initial size of the IP routing table is now 4k routes. The size of the routing table can be increased by adding memory in increments of 1k to 5k routes.

2.2.3 NBMA Interfaces

Some protocols, such as Classical IP (CLIP) do not offer a means for broadcasting. In *ForeThought* 5.0.1 support for Non-Broadcast Multiple Access (NBMA) provide the ability to run IP routing protocols over non-broadcast interfaces.

2.2.4 Increased Support for the Number of IP Filters

In *ForeThought* 5.0.1, the number of IP filters that can be configured has been increased to 256.

2.2.5 Support for Backup IP RIP Route

RIP can hold additional “next best cost” backup route. In the case an active route disappears, a backup route can be used in its place. This feature is useful in cases of redundant links to a particular destination. A failure of an active link results in the backup RIP route becoming active immediately.

2.2.6 Support for RIP and OSPF Neighbors on NBMA Interfaces

RIP or OSPF can be configured on NBMA Interfaces through a list of neighbor routers. This provides enhanced security and the ability to run RIP and OSPF over NBMA.

2.2.7 Additional Commands in IP/RIP Subsystem

Three additional command have been added in the IP/RIP subsystem: **`rd enable|disable`**, **`rl enable|disable`**, and **`rs enable|disable`**. These commands allow you to specify whether the PowerHub will advertise default routes, learned routes, and static routes.

2.2.8 Support for Displaying External LSDB Advertisements

In *ForeThought* 4.0.x, there is no way to display the External LSDB (elsdb) advertisements. The “OSPF lsdb” command only showed the network, summary, and router links, but not the external advertisements. The *ForeThought* 5.0.1 release has two commands for displaying the link state database. The lsdb command displays all the “regular” Link State Advertisements, as it did in *ForeThought* 4.0.x, while the **`elsdb`** command shows the external Link State Advertisements (external to the *PowerHub*).

2.2.9 New Stub Area Features

When adding an OSPF stub area, the user can now specify if the summary Link State Advertisements are to be flooded into the stub area. The default behavior is not to flood the summary Link State Advertisements into the stub area. In the *ForeThought* 4.0.x code, there is no such option.

2.2.10 Tracing and Debugging Support

Tracing and debug support has been added to the IP and ATM subsystem and supports the new routing and Multiple Protocol Over ATM (MPOA) features in *ForeThought* 5.0.1. This traceclass function displays information local to the *PowerHub* and allows the user to set the level of messages to display.

2.2.11 Login Failure Trap

The login failure trap sends SNMP traps whenever a user fails in an attempt to login to the *PowerHub*. This feature is enabled whenever the Lock Switch, either on the Packet Engine front panel or through setting the Lock Switch Jumper on the Packet Engine (*PowerHub 7000* only), is set to Lock. Whenever a user makes four failed attempts at logging into the *PowerHub*, a trap can be sent to the local SNMP management station. The trap contains information as to the date and time when the login was attempted, the Internet Protocol (IP) address of the station attempting the login, the login id used, and the reason the login was rejected.

2.3 Network Management

2.3.1 SNMP/MIBS/Traps

The following new MIBs, traps and general SNMP manageability have been added and can be tested though normal SNMP queries:

- add / delete IP interface
- IP MIB support: Support for IP interface table and IP route table MIBs
- MIB support for standard RIPv2 MIB and proprietary RIP MIB
- OSPF standard MIB support
- MIB tables for VLANs
- LANE services & LEC MIBs
- Login failure trap
- MPOA MIBs

2.4 ATM

2.4.1 Fail-Safe LNNI

The Independent NSAP feature of *ForeThought* 4.0.x has been made available to the DLE service point in *ForeThought* 5.0.1. Users setting up a DLE service peer on the PowerCell can use an Independent NSAP address for that peer (not to be confused with the DLE anycast address).

2.4.2 UNI 3.0/3.1 Auto-Select

The *ForeThought* 5.0.1 release allows the PowerCell to connect to an ATM switch running either UNI 3.0 or 3.1.

2.4.3 ILMI 3.0/3.1 Auto-Select

Similar to the UNI 3.0 / 3.1 auto-select, the PowerCell is also able to connect to an ATM switch port running either version of ILMI and establish full ILMI connectivity on that port.

2.4.4 Token Ring LANE Services

ForeThought 5.0.1 allows for LANE 1.0 emulated token rings over ATM. While the PowerCell does not offer a token ring media interface or a token ring LEC instance, it can house the LANE services for a token ring emulated LAN on the PowerCell 700.

2.4.5 Full FDDI MTU (*PowerHub 8000* Only)

Prior to FT_5.0.1, the *PowerHub* supported a FDDI maximum frame size of 4060. In the *PowerHub 8000*, full 4500 frames are supported.

2.4.6 Outbound Telnet

The *ForeThought* 5.0.1 release provides support for outbound Telnet sessions from the *PowerHub*. An outbound Telnet session can be invoked from the telnet subsystem. This session can be invoked from a TTY-based user interface or an inbound Telnet session. A maximum of two outbound Telnet sessions can be launched simultaneously from the *PowerHub*.

2.4.7 MPOA

A major portion of the *ForeThought* 5.0.1 release is support for Multi-Protocol Over ATM (MPOA). A separate document is available on design and testing guides from FORE on this functionality.

3.0 System Requirements

Refer to the *PowerHub 7000/8000 Hardware Reference Manual* (MANU0166-02) for detailed information on the hardware requirements for the *PowerHub 7000/8000*.

3.1 Firmware Requirements

The firmware listed in Table 1, as reported by the system **ver all** command, is required to take advantage of the new software and hardware features. To run *ForeThought* 5.0.1, you will need to upgrade the Boot PROMs for the Packet Engine/s and the PowerCell. If you are upgrading from a code prior to *ForeThought* 4.0.0, you will also need to upgrade the Boot PROMs for the Fast Ethernet and FDDI INIMS. The correct firmware versions for *ForeThought* 5.0.1 are listed in the table below. For complete upgrade procedures for firmware upgrades refer to Chapter 5 in the *PowerHub 7000/8000 Installation and Maintenance Manual*.

Table 1 - Recommended Firmware

Module	Firmware
Packet Engine 1	PE1-3.0.0 (s2)
Packet Engine 2	PE2-2.0.0 (s2)
PowerCell ATM Module	ATM-PE1, ATM-PE2 (s1.3)
FDDI Module	FDDI-PE1, FDDI-PE2 (s1.13)
Fast Ethernet Module	FETH-PE1, FETH-PE2 (s1.2)

3.2 Memory Requirements

Table 2 lists the memory requirements necessary to properly run this release of *ForeThought* software.

Table 2 - Minimum Memory Requirements

Module	Minimum Required
Packet Engine 1 (*PowerHub 7000*)	32MB
Packet Engine 2 (*PowerHub 8000*)	32MB
PowerCell ATM Module	32MB
6x1 Fast Ethernet Module	8MB

If you are upgrading an existing *PowerHub*, contact FORE Systems TAC for the required firmware or hardware upgrades required and the appropriate upgrade procedures.

4.0 Hardware

4.1 Redundant Packet Engine 2 (PE2) (*PowerHub 8000* Only)

PE2 redundancy provides the *PowerHub 8000* with a secondary packet engine. This secondary packet engine takes over control of the *PowerHub* in the event of a failure of the primary packet engine. For redundant packet engine configuration procedures, refer to section 3.6 in the *PowerHub 7000/8000 Installation and Maintenance Manual*.

4.2 10/100 Fast Ethernet Media Adapter

The 10/100 Fast Ethernet Media Adapter (FEMA) is supported by *ForeThought* 5.0.1 and will be released in the near future. The 10/100 FEMA operates on the 6x1 Universal Fast Ethernet Module only and accommodates ports running at 10Mb/s and at 100Mb/s. To detect at what rate to send and receive data, the 10/100 FEMA supports auto-negotiation, enabling it to determine both the speed and mode settings of the connecting device. The 10/100 FEMA's auto-negotiation feature removes the need to manually configure or physically move cables if the device at the other end also supports auto-negotiation and its auto-negotiation function has been enabled.

5.0 Configuration Restrictions

5.1 Intelligent Network Interface Module Limitations

The 15-slot *PowerHub 8000* chassis can only support up to 10 Intelligent Network Interface Modules (INIMs).

5.2 Multiple PowerCells

When using Multi-Protocol over ATM Servers (MPSs) on a *PowerHub* with multiple PowerCells installed, end-to-end shortcuts are not resolved for destinations for which the hop-to-hop routed path spans two PowerCells. Shortcuts are terminated on the first PowerCell in this case.

5.3 Maximum Recognized Segment Count

The *PowerHub* does not recognize segments over and above the maximum allowable supported segment count on a per chassis basis. The *PowerHub 7000* recognizes up to 96 segments, while the *PowerHub 8000* recognizes up to 128 segments. Table 3 lists the maximum configurable segments per NIM type.

5.4 Maximum number of IP Flows

The number of IP Flows per *PowerHub* box is limited to 1000 per segement, 4000 per PowerCell.

5.5 Multiple MPSs

If there are two MPSs on two different PowerCells in the same *PowerHub*, they have no knowledge of each other.

5.6 Maximum Number of VLANs

Packet Engine 1 supports a maximum of 150 VLANs and Packet Engine 2 supports a maximum or 113 VLANs.

5.7 MPOA Shortcuts

Shortcuts can only be triggered from a legacy segment. Traffic coming from an ATM segment does not trigger shortcuts.

5.8 Route and Interface Limitations

The *PowerHub* can not have 5000 routes and 256 interfaces configured at the same time.

5.9 10/100 FEMA

The 10/100 Fast Ethernet Media Adapter is not supported on a 13x1 card.

5.10 VLAN and Bridge Group Naming

IP VLANs and Bridge Groups cannot have the same name.

6.0 Upgrading from *ForeThought* 4.0.x

Table 3 - Maximum Segments per Network Interface Module

Network Interface Module	Maximum Segments
Universal Ethernet	6
16x1 Ethernet	16
4x4 Microsegment Ethernet	4
4x6 Microsegment Ethernet (Telco)	4
6x1 Universal Fast Ethernet	6
10x1 Fiber Optic Ethernet	10
13x1 Ethernet	13
Single FDDI	1
Dual FDDI	2
FDDI Concentrator 6-port	0
FDDI Concentrator 16-port	0
PowerCell 700 OC-3	32

In *ForeThought* 5.0.1, the method the *PowerHub* uses to generate an NSAP address has changed. The least significant nibble of the ESI portion of the NSAP address used by the PowerCell is now based on the slot number that the PowerCell occupies. For example, a PowerCell occupying slot 4 of a chassis would have the following NSAP addresses under releases *ForeThought* 4.0.x and *ForeThought* 5.0.1, respectively (xx represents the selector byte):

```
FT_4.0.x NSAP address: 47000480ffee000000f21a1c590000ef045320xx
FT_5.0.1 NSAP address: 47000480ffee000000f21a1c590000ef045324xx
```

Because the LES and BUS could be configured separately in *ForeThought* 4.0.x but will normally be co-located in *ForeThought* 5.0.1, old configuration files will not work. As a result, it will be necessary to save the new configuration file after changing the LES/BUS configuration. In addition, if the ESI portion of the NSAP will be changing, users upgrading from *ForeThought* 4.0.x to 5.0.1 will need to modify LECS configuration files as well.

6.1 PowerCell Prom Upgrade

To upgrade your PowerCell, contact FORE Systems Technical Support for upgrade procedures. Upgrading the PowerCell Prom to firmware version 1.3 implements a crash log facility on the PowerCell. The purpose of this crash log facility is to help diagnose the PowerCell crash. The RT PROM (Flash Memory), which is present on the PowerCell, is used to store up to eight different crash records of the PowerCell. The crash records can be transferred to a file, “GINIMLOG.DMP,” on the Packet Engine and analyzed. Each of the crash records contains the register information, stack, and a message log at the time of the crash. The message log is a circular buffer into which any messages can be logged. If the PowerCell crashes, the circular buffer along with the registers and stack information is stored in the Flash memory.

6.2 Packet Engine PROM Upgrade

As mentioned in section 3.1, you will need to upgrade the Packet Engine Boot Prom/s. For complete upgrade procedures for Packet Engine PROMs, contact FORE Systems Technical Support.

7.0 Known Problems

7.1 DLE

Multiple LESs can be configured with the same anycast address. If two or more LESs are configured with the same anycast address, ELANs could join the wrong LES.

7.2 IP Connectivity

When a telnet connection is established between a 9234/4544 elan host and a *PowerHub*, it is possible to lose IP connectivity to the *PowerHub* when large tables are displayed.

8.0 Contacting Technical Support

In the U.S.A., customers can reach FORE Systems' Technical Assistance Center (TAC) using any one of the following methods:

1. Select the "Support" link from FORE's World Wide Web page:

   http://www.fore.com/

2. Send questions, via e-mail, to:

   support@fore.com

3. Telephone questions to "support" at:

   800-671-FORE (3673) or 724-742-6999

4. FAX questions to "support" at:

   724-742-7900

Technical support for customers outside the United States should be handled through the local distributor or via telephone at the following number:

+1 724-742-6999

No matter which method is used to reach FORE Support, customers should be ready to provide the following:

- A support contract ID number
- The serial number of each product in question
- All relevant information describing the problem or question.